StationPi Pro

Raspberry Pi HAT Adapter Station

By IanCanada Apr. 2, 2022 Ver. 1.0b

A. Introduction

StationPi Pro was particularly designed for RaspberryPi based audio applications. It can optimize the integration of a digital transport or DAC to make them become more organized and well finished products. The whole audio performance can also be improved as a consequence of a lower EMI noise.

StationPi Pro is a fully assembles/finished product.

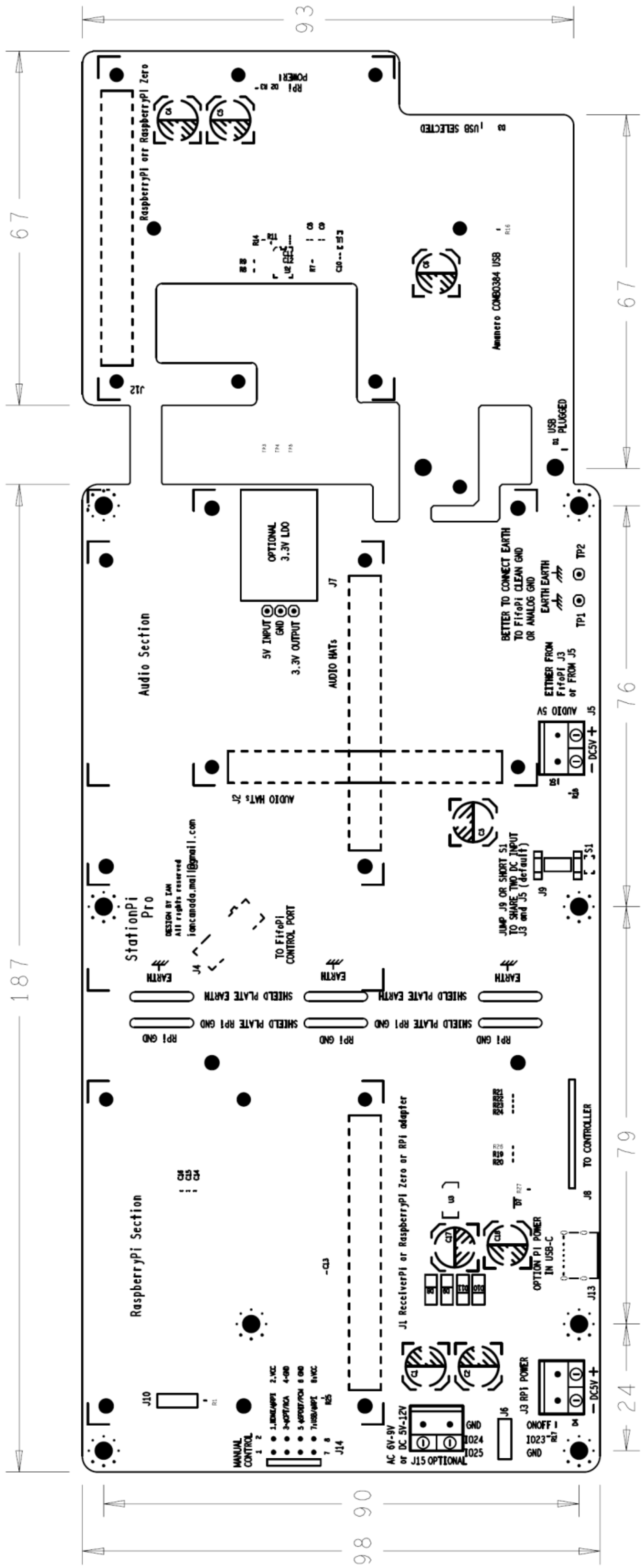
B. Highlighted Features

- Separate RaspberryPi and audio HATs into two stacks configuration,
- Independent power supplies for both RPi and audio stacks.
- Double ground plates to shield the RaspberryPi EMI noise.
- Easy and organized to integrate a whole audio project.
- Audio HATs can be installed in two different originations to meet the requirements of applications.
- Comes with a full set of screws and standoffs.
- Great to build DAC or digital transport projects.

C. KIT includes

- A whole piece of assembled Stationtion Pi Pro PCB and the daughter board PCB
- Two shield plates with spacer bits
- 6 x 6mm M3 standoffs
- 6 x M3 screws
- 6 x M3 nuts
- 4 x 11mmm M2.5 standoffs (to mount the Raspberry Pi to the daughter board)
- 13 x 13mmm M2.5 standoffs
- 13 x M2.5 screws
- 13 x M2.5 nuts
- 6 x 2.54mm jumpers

D. Layout and Dimensions (in mm)

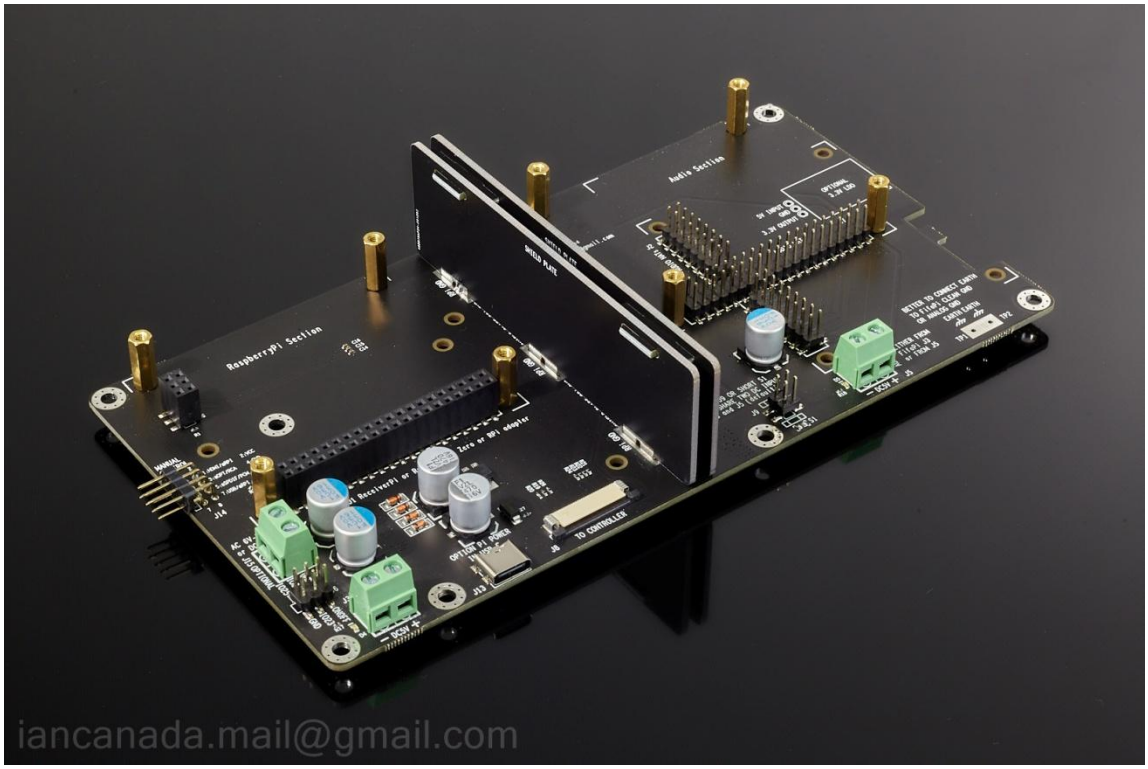

93
67
67
187
76
79
24
90
98
RaspberryPi orr RaspberryPi Zero
USB SELECTED
Amanero COMBO384 USB
USB PLUGGED
J12
OPTIONAL 3.3V LDO
5V INPUT
GND
3.3V OUTPUT
J7
AUDIO HATs
Audio Section
BETTER TO CONNECT EARTH TO FifoPi CLEAN GND OR ANALOG GND
EARTH EARTH
TP1
TP2
EITHER FROM FifoPi J3 or FROM J5
AUDIO 5V
J5
DC5V
AUDIO HATs J2
StationPi Pro
DESIGN BY IAN
All rights reserved
iancanada.mail@gmail.com
TO FifoPi CONTROL PORT
J4
JUMP J9 OR SHORT S1 TO SHARE TWO DC INPUT J3 and J5 (default)
J9
S1
EARTH
SHIELD PLATE EARTH
SHIELD PLATE RPI GND
RPI GND
RaspberryPi Section
J1 ReceiverPi or RaspberryPi Zero or RPi adapter
TO CONTROLLER
J8
OPTION Pi POWER IN USB-C
J13
J10
MANUAL CONTROL
J14
AC 6V-9V or DC 5V-12V
J15 OPTIONAL
GND
IO24
IO25
J6
J3 RPI POWER
ONOFF
IO23
GND

Note: Please download the StationPiProLayout.dxf file from the GitHub link for more detailed dimensions
https://github.com/iancanada/DocumentDownload

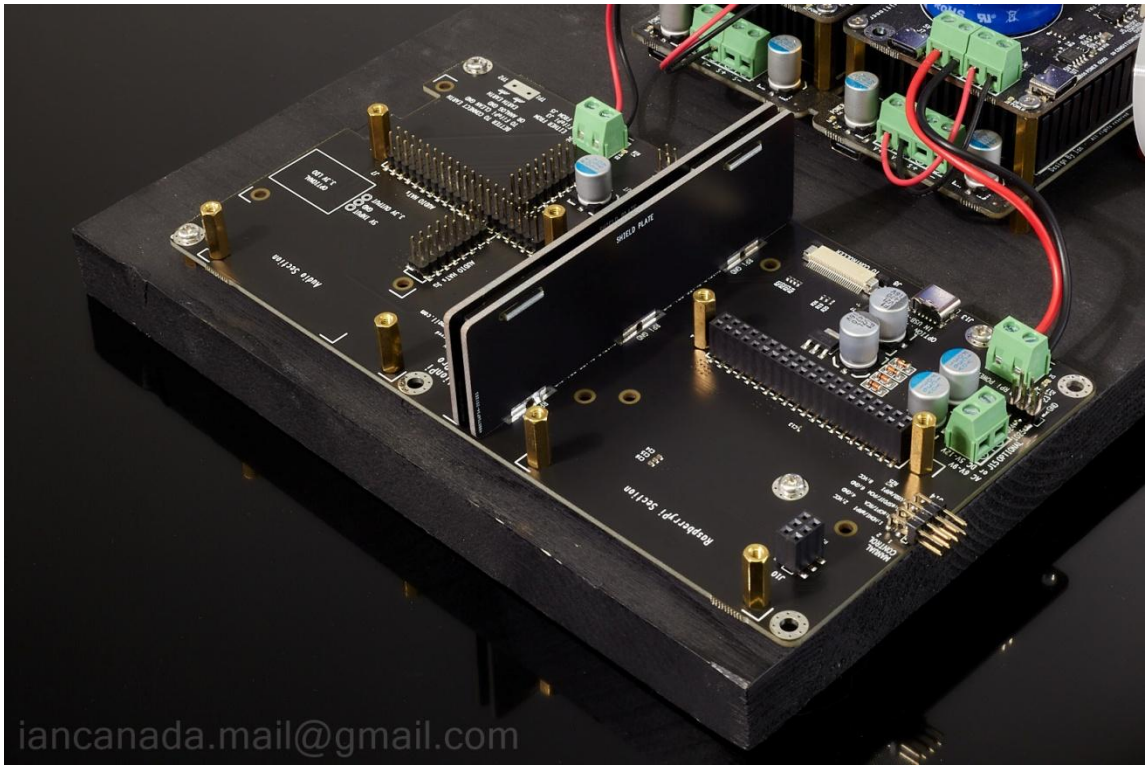
E. Getting start

1. Break the StationPi Pro board and the daughter board from the whole piece of PCB

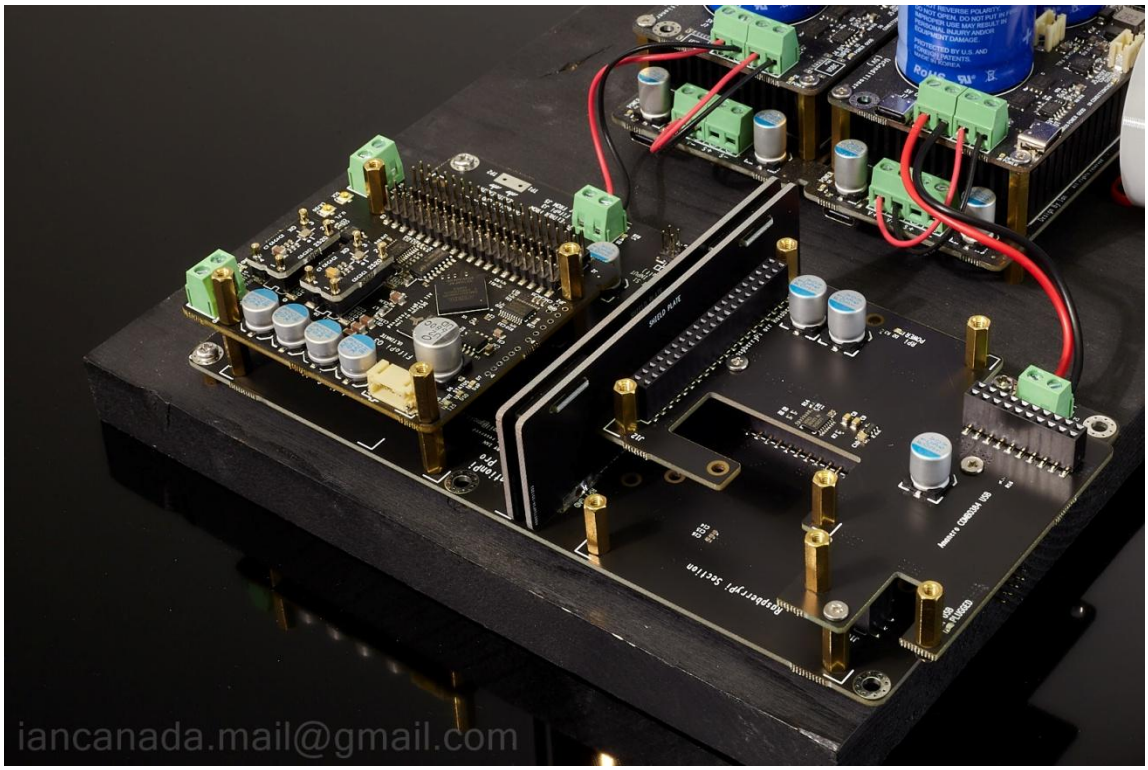
2. Install 8 13mm M2.5 standoffs to the StationPi PCB. If it is required, you can solder the two shield plates to the StationPi Pro PCB (just optional). Please use the spacer bits to separate the two plates well.



3. Mount the StationPi Pro PCB to the case/base using 4 or 6 M3 standoffs and screws. Connect a 5V RPi power supply to J3 or J13 (in USB-C). And connect a 5V audio power supply to J5. (Please see the application notes if you want to share one 5V power supply for both)

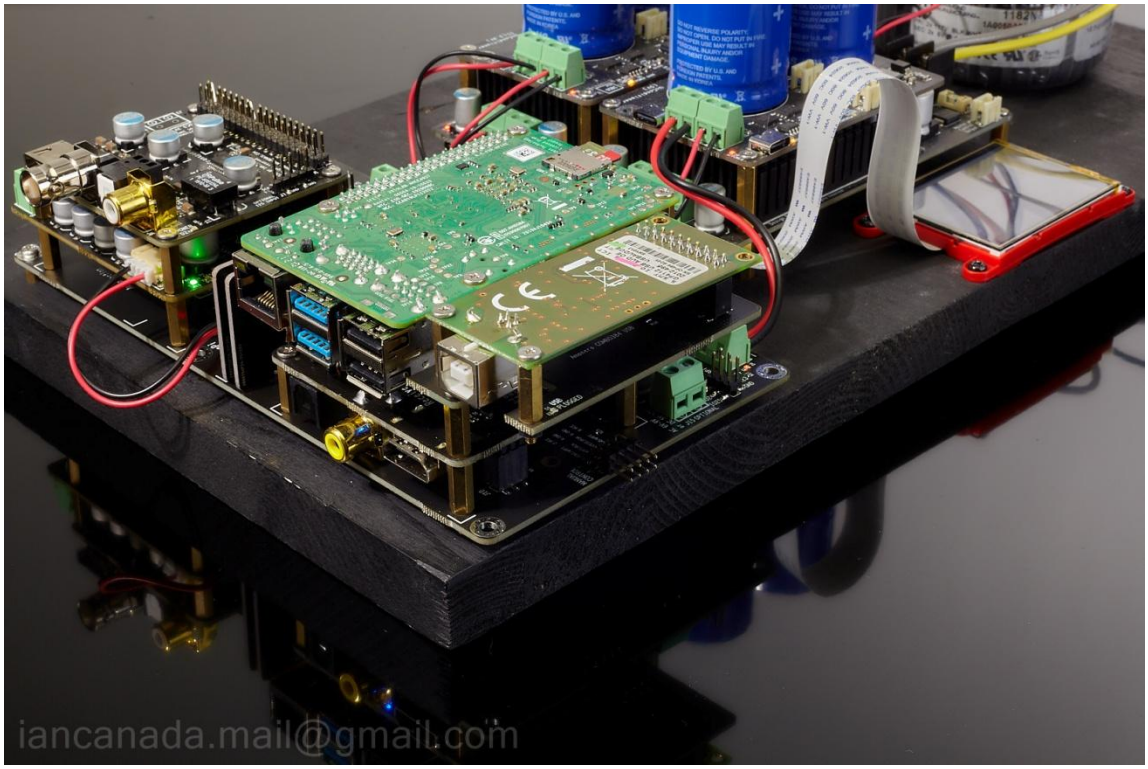


4. Assemble 4 of the **11mm** M2.5 standoffs to the daughter board and then install the daughter board the J1 of the StationPi PCB. Install a FifoPi or other audio HAT to J7 or J2 according to the orientation requirement of the project. Don't forget the connecting a 3.3V power supply for the FifoPi clean side or the other audio HAT.

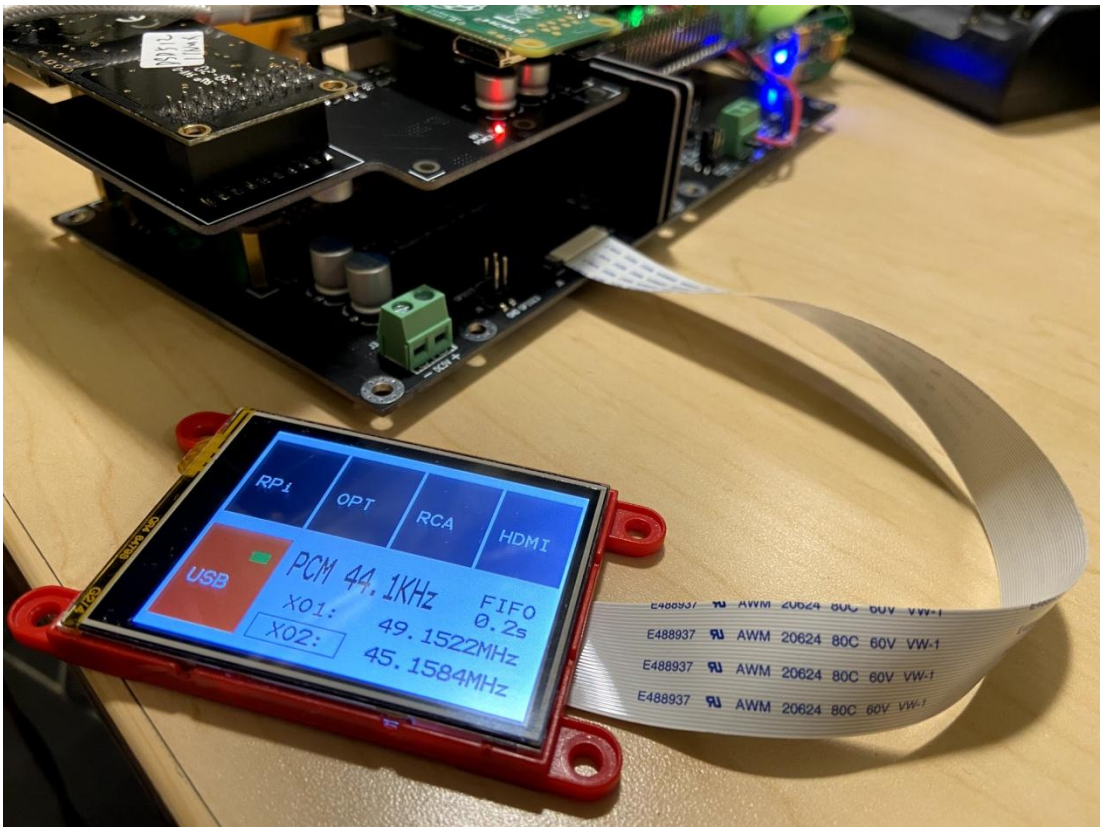


5. Install a RPi 4 /RPi 3 /RPi Zero 2 to the J12 on the daughter board. Install a TransportPi or a HDMIpi or other DAC HAT on top of the FifoPi. If it is required, install a Amanero size USB streamer directly to the daughter board (optional). Please see application note for how to select between RPi and USB as audio sources.

6. For a more advanced configuration, you can also install a ReceiverPi Pro underneath the daughter board. In this case, we will have five digital audio sources: RaspberryPi, RCA, optical, HDMI and USB. You can manually switch between them by J14 jumper settings or automatically by a touch screen StationPi Pro controller which can be connected to J8



7. The StationPi Pro controller will be an independent open source project. It makes use of a 4D System GEN4-ULCD-24PT or GEN4-ULCD-24PT as the touch screen display. The StationPi Pro controller can also work as a FifoPi controller when an additional control cable is connected between FifoPi and the StationPi



F. Application notes

1. How to manually select the digital audio sources?

A. If only a RPi is installed, it will be selected by default (J14 no jumper)

Besides the standard sync mode FIFO such as FifoPi Q3, a master mode FIFO such as a FifoPi Ma can also be used in this configuration.

B. If both RPi and USB streamer are installed to the daughter board

Short PIN7 and PIN8 of J14 by a jumper to select USB streamer (D3 will be lit)

Keep J14 open without jumper (default) to select the RPi.

If there is a FIFO in this configuration, have to use sync mode FIFO such as a FifoPi Q3.

C. If ReceiverPi MKII is installed

J14	1-2	3-4	5-6	7-8
RCA	X	SHORT	OPEN	X
OPT	X	OPEN	OPEN	X
HDMI	SHORT	X	SHORT	X
USB	OPEN	X	SHORT	SHORT
RPi	OPEN	X	SHORT	OPEN

If there is a FIFO in this configuration, have to use sync mode FIFO such as a FifoPi Q3.

2. How to install a StationPi Pro controller?

It would be nice to have a touch screen StationPi Pro controller if there are many audio sources when a ReceiverPi Pro is installed. To install the controller, you will need:

A. Buy a touch screen intelligent display module from 4dsystems.com

GEN4-ULCD-24PT or GEN4-ULCD-24PT

B. Program the module by following the documents of the open source project.

C. Connect the touch screen display module to StationPi Pro through a FFC/FCC cable (long extension cable sold separately).

D. If you want it to work as a FifoPi Q3 controller at the same time, please connect a control cable (sold separately) between J4 of FifoPi Q3 and J4 on StationPi Pro.

3. **How to share one 5V power supply with J3 and J5?**

   It is possible to use a single 5V power supply for both J3 and J5 if you really want to save the cost.

   To do so, you will need to short J9 with two jumpers (or bridge short S1). And then feed the 5V power supply to J3 or J13. J5 and J3 on FifoPi must be kept unconnected in this configuration.

4. **How to connect the earth?**

   Earth is internally connected to the clean side shield plates.

   You can connect the earth (TP1 or TP2) to the FifoPi clean side ground.

   Or you can connect the earth to the audio system ground according to the real experiences.

5. **What is J15 for?**

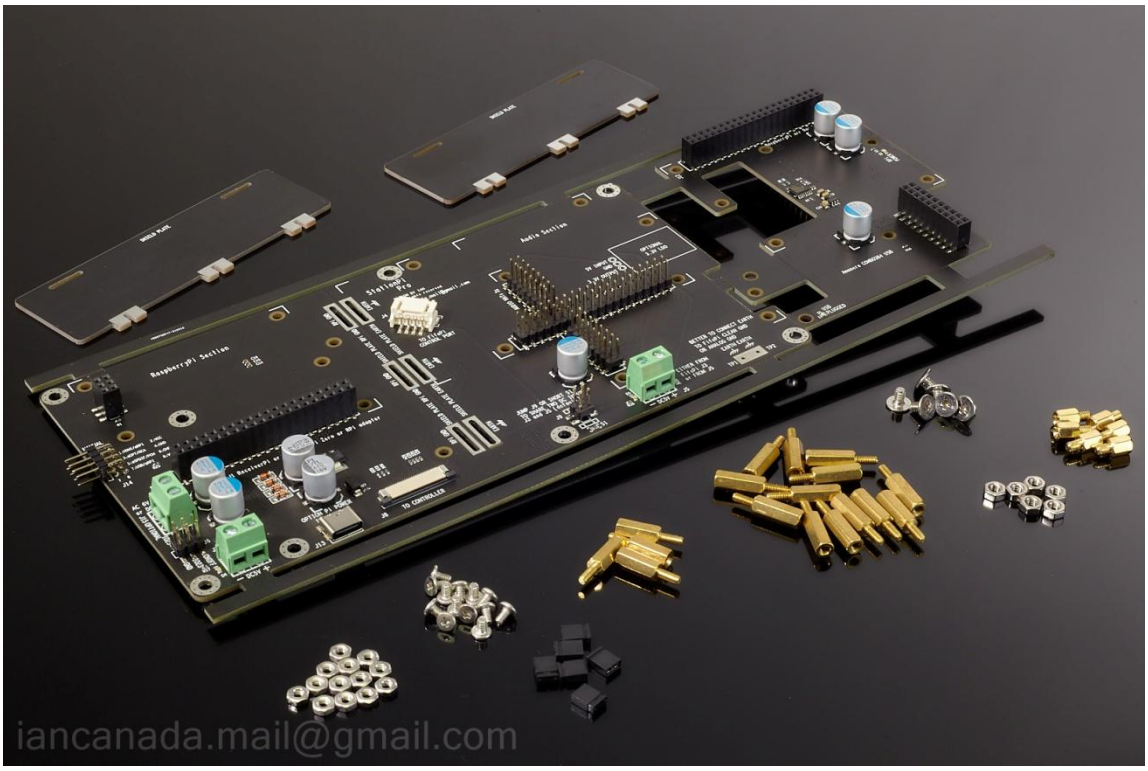
   J15 is an optional continuous AC/DC power supply for the StationPi Pro controller. Can use both AC 6-9V (can be from a small transformer) or DC 5-12V. 200mA rated current would be more than enough. When powering by this continuous power supply, StationPi Pro controller will be capable to perform ON/OFF control for the whole system. A later on upgraded FW will be required to implement this function. For now, please just keep J15 unconnected.

G. Schematic

Please download the StationPiProSchV1.0.pdf from GitHub for the StationPi Pro schematic.

H. Pictures

StationPi Pro as shipped



I. History of revising

Apr 2, 2022 V1.0b released